

component, wherein the first and second sensing axes are in substantially perpendicular relation, the first dual-axis accelerometer operable to output a first signal proportional to the sensed first acceleration component and to output a second signal proportional to the sensed second acceleration component, and

a second dual-axis accelerometer having a third sensing axis for sensing a third acceleration component and a fourth sensing axis for sensing a fourth acceleration component, wherein the third and fourth sensing axes are in substantially perpendicular relation, the second dual-axis accelerometer operable to output a third signal proportional to the sensed third acceleration component and to output a fourth signal proportional to the sensed fourth acceleration component.

#### REMARKS

Claims 11-17 and 23-25 are in the case. Claims 11-14 and 24-25 stand rejected. The action objects to claims 15-17, and 23. As discussed below, Applicants request that the Examiner withdraw the final rejection as being premature, since the rejection is not in accord with current PTO practice. Claims 13 and 14 are amended to depend from claim 12. Claim 25 is hereby amended to correct an inadvertent error.

Applicants appreciate the Examiner's acknowledgement that claims 15-17, and 23 would be allowed if rewritten in independent form to include all of the limitations of the base claim and any intervening claims. However, in the prior amendment Applicant amended claims 12, 15-17 to include all of the limitations of the base claim and any intervening claims based on the Examiner's notification of allowable subject matter. Claim 23 also depends from prior amended claim 15.

The Office Action rejections are respectfully traversed. Reconsideration and allowance of the claims are hereby respectfully requested. No new matter has been added by the amendment to claims 12, 13, and 25.

#### Premature Final Rejection

Applicants request that the final rejection of claims 11-14 and 24-25 be withdrawn as premature and improper. MPEP section 706.07(a) provides guidance as to when a final rejection is proper. That is, second or any subsequent actions on the merits shall be final, *except where the examiner introduces a new ground of rejection that is not necessitated by*

*applicant's amendment of the claims.* With regard to claims 12, 15-17, and 23, the Examiner, in the prior action, objected to these claims acknowledging their allowability if amended to include all of the limitations of the base claim and any intervening claims. In the prior amendment, Amendment C, Applicants amended these claims to include all of the limitations of the base claim and any intervening claims, complying with the Examiner's allowability determination regarding claims 12, and 15-17. Furthermore, these claims were fully examined in the prior action and a new search was not necessary since the claims were not substantively amended but only rewritten to comply with the notification of allowable subject matter. Thus, the final rejection should be withdrawn as improper, since Applicants amendment of these claims could not have necessitated the new ground of rejection.

MPEP section 706.07(a) states that a second or any subsequent action on the merits in any application *will not be made final* if it includes a rejection, on newly cited art of any claim not amended by applicant in spite of the fact that other claims may have been amended to require newly cited art. MPEP 706.07(a) also states that a second or any subsequent action on the merits in any application should not be made final if it includes a rejection, on prior art not of record, of any claim amended to include limitations which should reasonably have been expected to be claimed. As discussed above, claims 12 and 15 were amended to comply with an allowable subject matter notification and thus were amended to include formal matters which should reasonably have been expected to be claimed. For the foregoing reasons, Applicants request that the final rejection be withdrawn.

#### **Rejections Based on the 35 U.S.C. § 102(b)**

Claims 11-14, and 25 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Rider (U.S. Patent No. 4,566,327). Applicants respectfully traverse the rejections.

An anticipation rejection is proper when a reference teaches each and every element of a claim. *See Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987) ("A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference."). *See Also Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989) ("The identical invention must be shown in as complete detail as is contained in the . . . claim.").

Independent claims 11 and 12 are directed to an angular position sensing apparatus as part of an alignment system for aligning a centerline of a first shaft with a centerline of a second shaft. The angular position sensing apparatus having at least one accelerometer for generating a signal corresponding to the angular orientation of a sensor head with respect to the first shaft. A microprocessor processes the signal generated by the at least one accelerometer, and provides an output corresponding to the angular position of the sensor head relative to the first shaft.

Rider describes a system and techniques for reducing ripple to improve acceleration bandwidth in multifunction sensors. Rider's techniques are directed to measuring the attitude and heading of an aircraft or other navigable vehicle. Rider discloses a sensor assembly 10 which is installed in a vehicle. The assembly 10 includes a hysteresis motor 12 having a fixed axial shaft 14. The shaft 14 is mounted and rigidly affixed, at either end thereof, to a structural member 16, 16' having an orientation fixed with respect to the vehicle. A cylindrical motor housing or sleeve 18 is journaled for rotation about the shaft 14 on bearings 20, 22. The spin axis 23 of the sleeve 18 is coaxial with the shaft 14.

A pair of piezoelectric (PE) ceramic assemblies 36, 38 are mounted exteriorly on the opposite sides the rotating motor housing 18. A second pair of piezoelectric ceramic assemblies 50, 52 are shown mounted exteriorly on the rotating motor housing 18 for measuring accelerations in a plane perpendicular to the spin axis 23 of the sensor assembly 10. Rider discloses that the desired accelerations are available when the piezoelectric bender elements 36, 38, 50, 52 are rotated at a fixed frequency about the spin axis 23. Output voltages are detected and measured to determine the desired pitch and yaw rates of the vehicle.

Rider does not describe an angular position sensing apparatus as part of an alignment system for aligning centerlines of first and second shafts. Rider also does not disclose an alignment system including a sensor head for aligning centerlines of first and second shafts, where the system includes an angular position sensing apparatus having at least one accelerometer for generating a signal corresponding to the angular orientation of the sensor head with respect to the first shaft.

In a prior action, the Examiner stated in a restriction requirement that claims 11-17 are directed to an improvement in an alignment system for aligning centerlines of first and second shafts. MPEP 2111.02, 8<sup>th</sup> edition, provides guidance as to when the preamble of a

claim is actually a claim limitation. Preamble terminology that limits the structure of the claimed invention is treated as a claim limitation. *See Corning Glass Works v. Sumitomo Elec. U.S.A., Inc.*, 868 F.2d 1251, 1257, 9 USPQ2d 1962, 1966 (Fed. Cir. 1989) (The determination of whether preamble recitations are structural limitations can be resolved only on review of the entirety of the application "to gain an understanding of what the inventors actually invented and intended to encompass by the claim."); *See also Pac-Tec Inc. v. Amerace Corp.*, 903 F.2d 796, 801, 14 USPQ2d 1871, 1876 (Fed. Cir. 1990) (determining that preamble language that constitutes a structural limitation is actually part of the claimed invention); *See also Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305, 51 USPQ2d 1161, 1165-66 (Fed. Cir. 1999) ("If the claim preamble, when read in the context of the entire claim, recites limitations of the claim, or, if the claim preamble is 'necessary to give life, meaning, and vitality' to the claim, then the claim preamble should be construed as if in the balance of the claim.").

Thus, as described above, Rider does not anticipate claims 11 and 12. Rider is not related to an angular position sensing apparatus including at least one accelerometer used to align centerlines of first and second shafts. Rider describes a system for determining accelerations and angular rates of a vehicle. Rider also does not describe an angular position sensing apparatus comprising at least one accelerometer for generating an acceleration signal and a microprocessor for processing the accelerometer signal to provide an output which corresponds to the angular position of a sensor head relative to the first shaft. Thus, Rider does not describe an alignment system including the angular position sensing apparatus as claimed in claims 11 and 12. Reconsideration and allowance of claims 11 and 12 are respectfully requested.

Claim 12 was amended in the prior amendment to comply with the Examiner's notification of allowable subject matter. Applicants have amended claims 13 and 14 to depend from claim 12. Dependent claims 13 and 14 depend from independent claim 12, and contain additional important aspects of the angular position sensing apparatus. Therefore, dependent claims 13 and 14 are not anticipated by Rider since Rider does not describe an alignment system including an angular position sensing apparatus having at least one accelerometer for aligning centerlines of first and second shafts. Reconsideration and allowance of dependent claims 13 and 14 are respectfully requested.

Claim 25 is also rejected as being anticipated by Rider. However, claim 24 was inadvertently made dependent on claim 19 in the prior amendment. Per the present amendment, claim 25 is amended to depend from claim 24 and is therefore properly discussed below in conjunction with the rejection of claim 24.

Claim 24 is rejected under 35 U.S.C. § 102(b) as being anticipated by Thomas (U.S. Patent No. 5,798,828). The cases cited above in regards to anticipation rejections are equally pertinent here. Claim 24 is a new claim included in the prior amendment. Claim 24 is directed to an alignment system for aligning a first shaft. A sensing apparatus includes a sensor head coupled to the first shaft. A collimated light source is disposed on the sensor head for transmitting an energy beam and a photosensitive sensor is also disposed on the sensor head for sensing light and generating a position signal therefrom. The sensing apparatus includes at least one accelerometer disposed on the sensor head for generating a signal corresponding to the angular orientation of the sensor head with respect to the first shaft. A processor processes the signal generated by the at least one accelerometer and is operable to provide an output corresponding to the angular position of the sensor head relative to the first shaft based on the accelerometer signal.

Thomas describes a laser aligned five-axis position measurement device. Thomas discloses an arrangement of three digital sensors on two parallel laser beams for deducing position in 5 axes. The device measures position deviations in 5 axes while traversing a 6th linear axis. The device includes three components: a laser-beam unit which emits two parallel laser beams, a sensor unit including three laser-position sensors, one of them being transparent, and a microprocessor or computer unit *which converts X,Y laser sensor position data from the three laser position sensors to displacements in 5 axes: X (horizontal), Y (vertical), Pitch (angular motion about the X axis), Yaw (angular motion about the Y axis), and Roll (angular motion about the line of travel)*. Readout of the sixth axis, the line of travel or Z axis, is provided by means of a separate linear transducer. Thomas does not describe an alignment system including a sensing apparatus having at least one accelerometer mounted on a sensor head for generating a signal corresponding to the angular orientation of the sensor head with respect to a first shaft. Thus, Thomas does not anticipate claim 24. Reconsideration and allowance of claim 24 is respectfully requested.

Claim 25 depends from claim 24 and contains additional important aspects of the invention. Thus, claim 25 is also not anticipated by Thomas. Reconsideration and allowance of claim 25 is respectfully requested.

#### **CLAIM OBJECTIONS**

While Applicant has described why claim 12 is not anticipated by Rider, in the prior action, the Examiner stated that claims 12, and 15-17 would be allowable if amended to include all of the limitations of the base claim and any intervening claims. Since the Examiner acknowledged the allowability of claims 12, and 15- 17 in the prior action and Applicants amended these claims for allowance, Applicants believe that claims 12, 15-17, are allowable. Reconsideration and allowance of claims 12, 15-17, and 23 is respectfully requested.

#### **CONCLUSION**

Having now fully and completely responded to the office action, applicants assert that the claims are all fully in condition for allowance. Thus, reconsideration and allowance of all claims are respectfully requested.

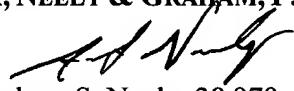
If the Examiner identifies further issues that may be resolved by telephone, the examiner is invited to contact the undersigned at 1.865.546.4305.

In the event that this response is not timely filed, applicants hereby petition for an appropriate extension of time. The fee for this extension, along with any other fees that may be due with respect to this response, may be charged to our deposit account number 12-2355.

Sincerely,

**LUEDEKA, NEELY & GRAHAM, P.C.**

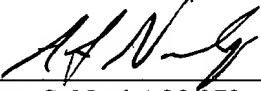
By:

  
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**MARKED UP VERSION TO SHOW CHANGES**

Claim 13. (once amended) The angular position sensing apparatus of Claim [11] 12, wherein the accelerometer is a single-axis accelerometer for generating a signal proportional to the angular orientation of the sensor head.

Claim 14. (once amended) The angular position sensing apparatus of Claim [11] 12, wherein the accelerometer is a dual-axis accelerometer having a radial and a tangential axis, for generating radial and tangential signals proportional to the angular orientation of the sensor head.

Claim 25. (once amended) The sensing apparatus of claim [19] 24 further comprising:

a first dual-axis accelerometer having a first sensing axis for sensing a first acceleration component and a second sensing axis for sensing a second acceleration component, wherein the first and second sensing axes are in substantially perpendicular relation, the first dual-axis accelerometer operable to output a first signal proportional to the sensed first acceleration component and to output a second signal proportional to the sensed second acceleration component, and

a second dual-axis accelerometer having a third sensing axis for sensing a third acceleration component and a fourth sensing axis for sensing a fourth acceleration component, wherein the third and fourth sensing axes are in substantially perpendicular relation, the second dual-axis accelerometer operable to output a third signal proportional to the sensed third acceleration component and to output a fourth signal proportional to the sensed fourth acceleration component.